L 3460-66 EWT(m)/EPA(w)-2/EWA(m)-2 LJP(c) DM

ACCESSION NR: AP5016934 UR/0089/65/018/006/0633/0634
621.384.612

AUTHORS: Vorob'yev, A. A.; Didenko, A. N.; Lisitsyn, A. I.; Morozov, B. N.; Potekhin, Yu. I.; Salivon, L. G.; Filatova, R. M.

TITLE: 10 MeV waveguide synchrotron

SOURCE: Atomnaya energiya, v. 18, no. 6, 1965, 633-634

TOPIC TAGS: synchrotron, circular accelerator, electron accelerator, high energy accelerator, waveguide

ABSTRACT: After first listing some of the theoretical problems involved in the design of accelerators of this type and dealt with at Institut yadernoy fiziki Tomskogo politekhnicheskogo instituta (Scientific Research Institute of Nuclear Physics of the Tomsk Polytechnic Institute), the authors describe briefly the 10 MeV synchrotron constructed and in operation at this institute since December 1963. The accelerating system is a rectangular waveguide bent in the shape of a ring, loaded with diaphragms on the outer wall. A standing H_{018} mode

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ACCESSION NR: AP5016934

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in the $\pi/2$ mode is excited in the waveguide. The radius of the equilibrium orbit of the electrons, on which the phase velocity of the H_{018} wave is equal to the velocity of light, is 13 cm. The waveguide interaction space measures 6 x 6 cm. The system Q is approximately 300, the shunt resistance is approximately 0.07 Meg. The electrons are first accelerated to 3 MeV in the betatron mode by a Kerst gun. The high-frequency electromagnetic oscillations are generated by a pulsed 10-cm generator of 5,000 μsec pulses of 400 W each. The operating pressure is 2×10^{-5} mm Hg. Several of the control and construction features are briefly described. 'We thank the students of the Tomsk Polytechnic Institute V. I. Zhuravlev, A. M. Voloshin, P. I. Matyazh, A. A. Kushch, and A. N. Pershin, who participated in the adjustment and startup of the installation, and also Ye. S. Kovalenko and A. P. Ol'shanskiy for participating in the development of the accelerator theory, its design, and model test.' Orig. art. has: 1 figure

ASSOCIATION: None

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L 3460-66
ACCESSION NR: AP5016934

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SUBMITTED: 09Jul64 ENCL: 00 SUB CODE: NP

NR REF SOV: 007 OTHER: 001

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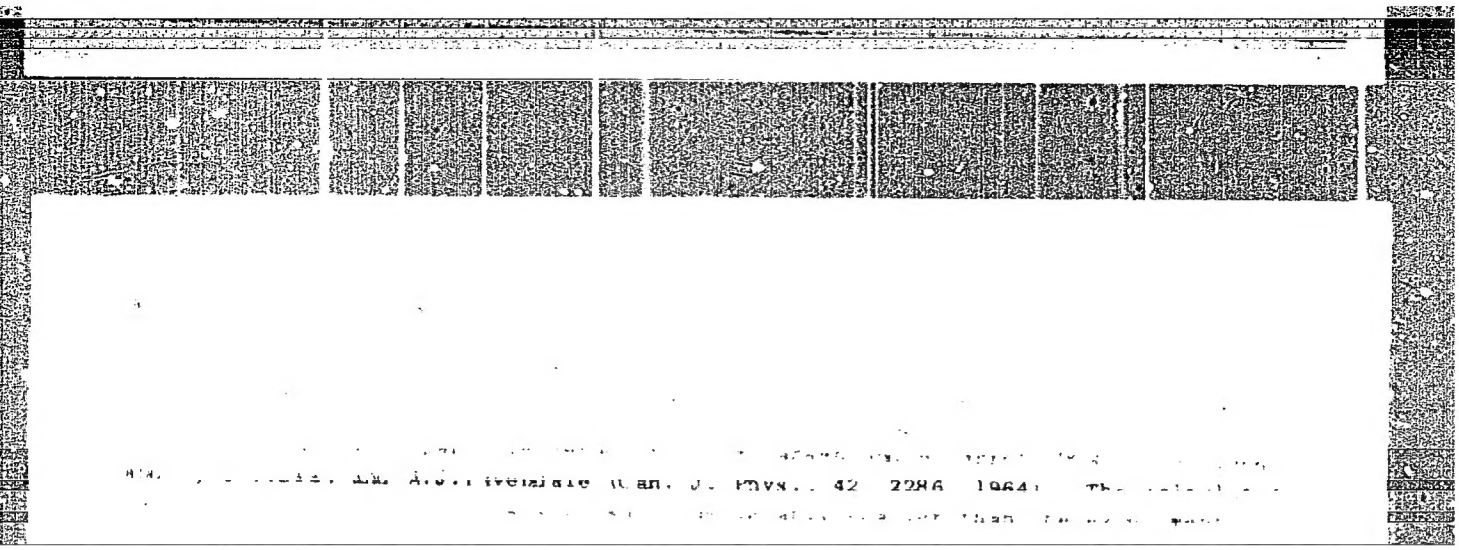

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001860820002-4"

USPENSKIY, V.P., inzhener; VOROB'YEV, A.A., inzhener.

Eighty-meter sectional belt conveyer. Mekh.stroi. 4 no.10:8-11 Oct. '47. (MLRA 9:3)

1. VNIIStroydormash, Lenfilial.
(Conveying machinery)

VOROBYEV, A. A.

BOLOTOV, P. A. Inzhener i OSTANKOVICH, M. A. Inzh., VOROBYEV, A. A. Inzh. SHIGILDEYEN, G. N. Inzh.

Leningradskiy filial Vsesoyuznogo nauchno-issledovatel'skogo instituta stroitel'nogo i dorozhnogo mashinostroyeniya

RASTVORONASOS PROIZVODITEL'NOST'YU 1-2 m3/chas DLYA ZHESTKIKH RASTVOROV Page 143

SO: Collections of Annotations of Scientific Research Work on Construction, completed in 1950. Moscow

VOROB'YEV, A.A., inzhener.

Pneumatic machinery for unloading cement from railroad cars and barges. Stroi.i dor.mashinostr. 1 no.10:14-16 O '56. (MLRA 9:11)
(Loading and unloading)

VOROB'YEV, A.A

PODBORSKIY, L.Ye., inzh.; VOROB'YEV, A.A., inzh.; BARKOVSKIY, Ye.A., inzh.

Pneumatic automatic cement pumps. Stroi.i dor.mashinostr.2 no.9:14-15 S '57. (MIRA 10:11)
(Pumping machinery) (Cement)

VOROB'YEV, A.

VOROB'YEV, A., inzh.

Production of "silicalcite" products is being organized in Moldavia. Stroi.mat. 3 no.11:40 N '57. (MIRA 10:12)
(Kishinev--Silicates--Congresses)

VOROB'YEV, A., inzh.

Mechanized assembly line production of shell rock. Stroi. mat. 4 no.9:12-13 S '58. (MIRA 11:12)
(Moldavia--Quarries and quarrying--Equipment and supplies)

VYGODCHIKOV, G.V.; GEKKER, V.D.; LARINA, I.A.; SERGEYEVA, N.S.; VOROB'YEV, A.A.; SALTYKOV, R.A.

Basic principles underlying the production of polyvalent vaccines against anaerobic and intestinal infections. Zhur. mikrobiol., epid. i immun. 40 no.3:9-14 Mr '63. (MIRA 17:2)

1. Iz Instituta epidemiologii i mikrobiologii imeni Gamalei AMN SSSR.

KONSTANTINOV, V.V., inzh.; VOROB'YEV, A.A., inzh.; NIKITIN, A.I., inzh.; BAN'KOVSKAYA, N.N., inzh.; SHEVCHENKO, V.I., inzh.

Using granulated slags in making high-strength concretes for prestressed floor panels. Bet. i zhel.-bet. no.6:234-235 Je '58. (MIRA 11:6)

(Kishinev--Concrete)

VOROB'YEV, A.

Over-all mechanization of cement unloading from railroad cars.
Stroitel' no.11:23 '58. (MIRA 11:12)

1. Rukovoditel' laboratorii oborudovaniya dlya razgruzki i pnevmaticheskogo transporta tsementa Leningradskogo filiala Vsesoyuznogo nauchno-issledovatel'skogo instituta stroitel'nogo i dorozhnogo mashinostroyeniya.
(Loading and unloading) (Cement--Transportation)

Vorob'yev, A.A.

PHASE I BOOK EXPLOITATION SOV/3482

Nauchno-tekhnicheskoye obshchestvo mashinostroitel'noy promyshlennosti. Sverdlovskoye otdeleniye

Mekhanizatsiya i avtomatizatsiya mashinostroitel'nogo proizvodstva (Mechanization and Automation in the Machine-Building Industry) Moscow, Mashgiz, 1959. 319 p. 12,000 copies printed.

Ed.: Ye. V. Pal'mov, Doctor of Technical Sciences; Tech. Ed.: [illegible] Editorial Board: P. P. Vakhrushev, Engineer, V. V. [illegible], Candidate of Technical Sciences, Ye. V. Pal'mov, Doctor of Technical Sciences, [illegible] Purchikov, Candidate of Technical Sciences, V. V. [illegible], Candidate of Technical Sciences, K. N. Sobolev, Candidate of Technical Sciences, V. I. Sokolovskiy, Candidate of Technical Sciences, [illegible], B. K. Shumayev, Candidate of Technical Sciences, and P. V. [illegible], Professor.

PURPOSE: This book is intended for production engineers and personnel [illegible] in industrial planning.

COVERAGE: The material presented in this book is said to be based on practices developed and tested in the machine-building plants of the Urals and of Siberia. Listed are various methods of mechanization and automation and their applications in foundries, forging shops, and assembly shops. Other fields of use include welding, hoisting, conveying, heat treatment, and quality control on an industrial scale. Various mechanisms, devices, tools, and instruments currently used in mechanization and automation of these industrial processes are described and illustrated. The equipment mentioned is said to have been produced by the plants using their own resources. The economic aspects of mechanization and automation are discussed. There are 104 Soviet references.

Card 6/15

VOROB'YEV, A.A.

Small-scale mechanization in quarrying limestone. Stroi. mat. 6 no.7:32 Jl '60. (MIRA 13:7)
(Limestone)
(Quarries and quarrying--Equipment and supplies)

VOROB'YEV, A.A.

[The international system of units] Mezhdunarodnaia sistema edinits. Moskva, Mosk. khimiko-tekhn. in-t im. D.I.Mendeleeva, 1963. 24 p. (MIRA 17:4)

VOROB'YEV, A.A.

AUTHORS: Bochagov, B. A., Vorob'yev, A. A., Komar, A. P. 57-27-7-20/40

TITLE: An Impulse Ionization Chamber as a Device for the Simultaneous Investigation of the Energetic and Angular Distributions of Charged Particles (Impul'snaya ionizatsionnaya kamera kak pribor dlya odnovremennogo izucheniya energeticheskikh i uglovykh raspredeleniy zaryazhennykh chastits).

PERIODICAL: Zhurnal Tekhnicheskoy Fiziki, 1957, Vol. 27, Nr 7, pp. 1575-1577 (USSR)

ABSTRACT: It is shown that the energy E (half width of the lines of α-spectra) and the angle of flight φ (between the normal to the electrodes and the direction of flight of the charged particle) of the particle concerned can be determined beginning from the source, when the quantity of the impulse V_1 (the voltage at the collecting electrode) and the quantity of one of theimpulses V_2 (the voltage at the high-voltage electrode), V_3 (the voltage at the power supply or V_4 (the voltage at the moment where all electrons have reached the collecting electrode) is simultaneously measured. The accuracy of measurement of cos φ in this connection is about 3% and can be improved. At present a mechanical collimator is often used in measurements of the energy of α-particles may also be brought to collimation without a mechanical collimator due to the fact that the ionization chamber permits a simultaneous measurement of E and

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An Impulse Ionization Chamber as a Device for the Simultaneous Investigation of the Energetic and Angular Distributions of Charged Particles. 57-27-7-20/40

φ. The method suggested here can also be employed for the solution of problems of α-spectroscopy, for theinvestigation of the α- - correlation, the neutron-spectrum according to the protons given off and for the investigation of the angular distribution of heavy products of nuclear reactions. There are 3 figures.

ASSOCIATION: Leningrad Polytechnic Institute imeni M. I. Kalinin (Leningradskiy politekhnicheskiy institut im. M. I. Kalinina)

SUBMITTED: January 27, 1956

AVAILABLE: Library of Congress

1. Ionization chambers-Applications 2. Particles-Energy-Measurement
3. Particles-Transmission-Analysis

Card 2/2

AUTHOR KOROB'YEV, A.A., KOROLEV, V.A., KOMAR, A.P., SELIVERSTOV, D.M., PA - 2994

TITLE The Coefficient of the Interior Conversion of γ-Radiation with the Energy 53 KeV on the L-Shell of the Th^{230}.
(Koeffitsyent vnutrennoy konversii γ-izlucheniya energii 53 keV na L-obolochke Th^{230} - Russian)

PERIODICAL Zhurnal Eksperim. i Teoret. Fiziki, 1957, Vol 32, Nr 3, pp 623-623, (U.S.S.R.)
Received 6/1957 Reviewed 7/1957

ABSTRACT According to the data obtained from publications this coefficient is probably large. The authors determined this conversion coefficient by means of the method of α-γ coincidences. An enriched U^{234} source was used. The α-particles were recorded by means of a momentum ionization chamber and the γ-quanta by means of a scintillation counter with an NaJ(Tl)-crystal. The γ-spectrum was recorded in coincidence with the α-particles which lead to the basic level and to the first excited level of the Th^{230}. This radiation originates entirely from the inner conversion on the L-shells of the Th^{230}. The coefficient of conversion was determined from the ratio of the number N_R of the radio X-ray quanta (without absorber) to the number N_γ of 53 keV - quanta (which were reduced to the same number N_α of the recorced α-particles.) The result $N_R/N_\gamma = 13\%$ was obtained. The error committed in measuring remains below 50%. The extrapolation of the theoretical value furnishes the following values for the sum of the coefficients of conversion on the L_I-, L_{II}- and L_{III} shells, according to the type of radiation,

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PA - 2994

The Coefficient of the Interior Conversion of γ-Radiation with the Energy 53 KeV on the L-Shell of the Th^{230}.

E_1	E_2	E_3	M_1	M_2
<1,0	17e	>5.1e³	~25	>50e

A comparison with experimental results permits the conclusion that the radiation observed is an electric quadrupole radiation. Because the ground state of the even-even nuclei has the angular momentum 0 and the parity +, the first excited level of Th^{230} must have the angular momentum 2 and the parity +. The results obtained experimentally confirm the rotation-like nature of this level (corresponding to BOHR'S model). (2 illustrations).

ASSOCIATION Leningrad Physical-Technical Institute of the Academy of Science of the U.S.S.R.
PRESENTED BY
SUBMITTED 17.12.1956.
AVAILABLE Library of Congress.
Card 2/2

SOV/120-59-1-21/50

AUTHORS: Vorob'yev, A. A., Korolev, V. A., Solyakin, G. Ye.

TITLE: Measurement of the Grid Current in the Tubes Employed in Low-Noise Amplifiers (Izmereniye setochnogo toka v lampakh, ispol'zuyemykh v usilitelyakh s nizkim shumom)

PERIODICAL: Pribory i tekhnika eksperimenta, 1959, Nr 1, pp 85-89 (USSR)

ABSTRACT: It is known from the Nyquist theory that the noise produced by the grid current can be expressed by:

$$\overline{U^2_{sh.s.}} = \frac{eI_c}{\pi} \int_0^\infty \frac{R^2 F(\omega) d\omega}{1 + \omega^2 \tau^2} \quad , \qquad (3)$$

where $\tau = RC$, I_c is the grid current; R is the grid leak of the tube and C is its input capacitance; function $F(\omega)$ in Eq (3) is formed by the product of the transfer functions of an integrating and a differentiating network; the time constants of the networks are $T_1 = T_2 = T$. Consequently,

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Measurement of the Grid Current in the Tubes Employed in Low-Noise Amplifiers

the grid current noise can be expressed by Eq (4), where $q = \tau/T$. If the tube contains a resistor R at its input, the noise due to this can be expressed by Eq (6). Provided the same function $F(\omega)$ is used, the integration of Eq (6) results in Eq (7). The maximum value of the thermal noise, expressed by Eq (7), occurs when the resistance is given by Eq (8); this value is given by Eq (9). On the other hand, the maximum value of the noise produced by the grid current is given by Eq (5). Consequently, the grid current can be expressed in terms of a ratio of the maximum grid current noise to the thermal noise and this is expressed by Eq (10). This equation can be used for determining the value of I_C .

By comparing Eqs (3) and (6), it is found that the relationship between the grid current noise and the thermal noise is expressed by Eq (15). This can also be used for determining I_C ; for example, if a value of R is determined such that the current noise is equal to the thermal noise, the grid current is given by Eq (16); here, R_O is the value of R necessary to secure the equality of the two noises. The above methods were employed to measure the grid current in the tube

Measurement of the Grid Current in the Tubes Employed in Low-Noise Amplifiers

Type 6Zh1P which were operated as triodes with an anode voltage of 60 V and a heater voltage of 6 V. The dependence of the total noise on the input resistance is illustrated in Fig 2. From this it is found that the grid current was $1.0 \cdot 10^{-10}$ A, when determined from Eq (11) (or from Eq 14), and it was 1.15×10^{-10} A when evaluated from Eq (16). The authors express their gratitude to F. M. Sobolevskaya for her help in the measurements, to S. N. Nikolayev for discussing the results, and to A. P. Komar for his interest in this work. The paper contains 3 figures and 2 references, of which 1 is English and 1 is Soviet.

ASSOCIATION: Leningradskiy fiziko-tekhnicheskiy institut AN SSSR (Leningrad Physics Engineering Institute of the Soviet Academy of Sciences)

SUBMITTED: February 5, 1958.

SOV/120-59-2-27/50

AUTHORS: Vorob'yev, A.A., Korolev, V.A. and Solyakin, G.Ye.

TITLE: The Choice of Optimum Pass-band in an Amplifier Working with an Ionization Chamber (Vybor optimal'noy polosy propuskaniya v usilitele, rabotayushchem s ionizatsionnoy kameroy)

PERIODICAL: Pribory i tekhnika eksperimenta, 1959, Nr 2, pp 95-102 (USSR)

ABSTRACT: A calculation is made of the optimum bandwidth of an amplifier with two differentiating circuits. It is shown that the introduction of the second differentiating circuit completely avoids the influence of microphonic effects and low frequency noise without deteriorating the signal-to-noise ratio, The resolving power of an ionization alpha-spectrometer is determined basically by the noise in the first valve. When the leakage resistance of the first valve is high enough thermal noise may be neglected and only the contributions of anode and grid current taken into account. Usually the maximum signal-to-noise ratio is guaranteed by correct choice of amplifier bandwidth and this usually means inserting a differentiating and an integrating circuit. This case has already been considered by Elmore in Ref 1.

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The Choice of Optimum Pass-band in an Amplifier Working with an Ionization Chamber

This scheme has a number of drawbacks; in particular the location of the differentiating circuit is difficult, since it is preferable to place it before the amplifier in order to avoid overloading on microphony, but also convenient to place the circuit within the middle of the amplifier when A.C. heaters are used. In the analysis for brevity an arrangement of one differentiator followed by one integrator is described as {1,1}; the cases {1,2} {2,2} are also considered. The spectral densities of the grid and anode currents are given by Eqs (1) and (2). For the three circuit combinations described above, expressions for the minimum value of noise are given by Eqs (8), (12) and (17). In the many curves which are presented two parameters are used; p which is the ratio of the time constants of the integrator and the differentiator circuits, and a which is defined in Eq (5). In calculating signal-to-noise ratio it is assumed that a rectangular voltage pulse is delivered from the ionization chamber. Signal-to-noise ratio is denoted by Q . In Fig 1 the signal-to-noise ratio is

The Choice of Optimum Pass-band in an Amplifier Working with an Ionization Chamber

given by a solid line and the signal amplitude by the dotted lines. Figs 3, 4 and 5 show for the three circuit arrangements respectively the variation of signal-to-noise ratio with p for various pulse durations. Figs 6, 7 and 8 are the corresponding figures with p and a as parameters. Ionization chambers suffer from microphony at frequencies up to 100 c/s. By using two differentiating circuits the contribution to the microphony may be reduced with respect to that due to valve noise by a factor of approximately 100 at a frequency of 100 c/s; at lower frequencies this reduction is even more significant. It has so far been assumed that the voltage pulses are truly rectangular; in practice they have sloping fronts and if these slopes are linear it is possible to calculate easily the loss in amplitude as a function of the differentiating and integrating circuits. This loss is shown plotted in Figs 9 and 10 respectively for single and double circuits. Table 1 summarizes the amplitude loss for various rise times for the three types

The Choice of Optimum Pass-band in an Amplifier Working with an Ionization Chamber

of circuit; this is experimental data. For all three circuits the relationship between amplitude loss and rise time is quadratic. In Table 2 experimental and calculated results are compared for various values of differentiator and integrator time constant; this table applies to the case of {1,2} . The authors thank M.F. Sobolevskaya and A.P. Komar.

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There are 10 figures, 2 tables and 2 English references.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN SSSR (Physico-Technical Institute of the Academy of Sciences, USSR)

SUBMITTED: February 13, 1958

75333
SOV/57-29-10-10/18

9.3000

AUTHORS: Vorob'yev, A. A., Ivanov, B. A., Komar, A. P., Korolev, V. A.

TITLE: Influence of Ramsauer-Townsend Effect on the Mobility of Electrons in Spectroscopically Pure Argon

PERIODICAL: Zhurnal tekhnicheskoy fiziki, 1959, Vol 29, Nr 10, pp 1252-1258 (USSR)

ABSTRACT: The purpose of the paper is to verify the influence of Ramsauer-Townsend effect on the mobility of electrons in spectroscopically pure argon. The study is experimental in nature. The drift of electrons is measured as a function of E/p, where E is intensity of the electric field and p is barometric pressure of argon in the experimental chamber. The experiments were carried out for values of E/p between 0.001 and 1.5. At small values of E/p a maximum was observed similar to that obtained by other investigators. This maximum could be explained as the result of the Ramsauer-Townsend effect, or it might have been caused by the excitation of molecular levels owing to the presence of impurities in argon. For this reason industrial argon of 99.6% was also used. The ionization chamber was filled with argon at

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Influence of Ramsauer-Townsend Effect on the Mobility of Electrons in Spectroscopically Pure Argon

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pressures of up to 1,000 mm Hg. For a source of α-particles U^{234} was used. The impurities in the spectroscopically pure argon amounted to less than 10^{-4}%. The total sum of errors did not exceed 20%. The mean free path λ of the electrons at a pressure of 1 mm Hg and the average fraction of energy f lost in one collision were measured, and the values obtained fully corroborated the influence of the Ramsauer-Townsend effect on the election mobility in the spectroscopically pure argon. When industrial argon was used it was found that the value of f is affected by argon impurities influencing the maximum value of E/p. This, however, is not to be taken as the result of Ramsauer-Townsend effect. There are 6 figures, and 8 references, 6 U.S., 1 Canadian, and 1 French. The U.S. and Canadian references are: Nielsen, R. A., Phys. Rev., 50, 950, 1936; Klema, E. D., Allen, J. S., Phys. Rev., 77, 661, 1950; Kirshner, J. M., Toffolo, D. S., J. Appl. Phys., 23, 594, 1952; Bortner, T. E., Hurst, G. S., Stone, W. G., RSI, 28, 103, 1957; Bell, P.R., Jordan, W. H., Davis, R. C., Phys. Rev., 83, 490, 1951; Colli, L., Facchini, U., RSI, 23, 39, 1952; English, W. N., Hanna, G. C., Can. J. Phys., 31, 768, 1953.

Card 2/3

Influence of Ramsauer-Townsend Effect on the Mobility of Electrons in Spectroscopically Pure Argon

79?;3
SOV/57-[illegible]-10-10/18

ASSOCIATION: Institute for Technical Physics, Academy of Sciences, USSR (Fiziko-tekhnicheskiy institut, AN SSSR)

SUBMITTED: April 27, 1959

Card 3/3

24(7)

AUTHORS: Vorob'yev, A. A., Komar, A. P., Korolev, V. A., Solyakin, G. Ye.

SOV/56-37-2-32/56

TITLE: The α-Spectrum of the Natural Mixture of Isotopic Samarium

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 37, Nr 2(8), pp 546 - 548 (USSR)

ABSTRACT: In the present "Letter to the Editor" the authors report on investigations of the α-spectrum of Sm^{147} and the isotopic mixture by means of a pulse ionization chamber; the chamber was filled with chemically pure argon (99.9% Ar, $+O_2$, N_2, CO_2). The measured α-spectrum of Sm^{147} is shown by figure 1; it has a half width of 43 kev (when intensive α-emitters, as e.g. U^{234}, were used, the half width amounted to 30 kev). The energy of the α-particles of Sm^{147} was determined as amounting to (2.19 $\pm$ 0.01) Mev, which agrees well with the value mentioned in reference 6. Figure 2 shows the spectrum of the α-particles of the natural isotopic mixture (without collimation) within

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The α-Spectrum of the Natural Mixture of Isotopic Samarium SOV/56-37-2-32/56

the energy interval of 2.0 - 2.8 Mev. The energy of the α-particles of Sm^{146} is (according to reference 7) equal to $\sim$ 2.55 Mev; knowledge of this fact and of the entire background (within the range of 1.5 - 2.5 Mev - 1 pulse/hour) makes it possible to evaluate the upper limit of the Sm^{146}-content in the natural isotopic mixture and thus to determine the half lives: $T(Sm^{147}) = 10^{12}$a and $T(Sm^{146}) = 5.10^{7}$a. The Sm^{146}-concentration in the natural isotopic mixture is not greater than $2.5.10^{-6}$ % (the number of α-particles originating from Sm^{146}-decay does not exceed the background). According to a mass-spectrometric analysis the content would amount to 8.10^{-5} % (Ref 8). There are 2 figures and 8 references, 1 of which is Soviet.

ASSOCIATION: Leningradskiy fiziko-tekhnicheskiy institut Akademii nauk SSSR (Leningrad Physico-technical Institute of the Academy of Sciences, USSR)

SUBMITTED: March 26, 1959

Card 2/2

VOROB'YEV, A.A.

PHASE I BOOK EXPLOITATION SOV/5333

Pchelintseva, G. M., ed.

Uskoriteli; sbornik statey (Accelerators; Collection of Articles) Moscow, Atomizdat, 1960. 121 p. Errata slip inserted. 5,000 copies printed.

Scientific Ed.: B.N. Yablokov; Ed.: G.M. Pchelintseva; Tech. Ed.: N.A. Vlasova.

PURPOSE: This collection of articles is intended for scientists and engineers engaged in the construction and operation of particle accelerators.

COVERAGE: These original articles treat specific problems arising in the operation of present-day accelerators, particularly linear electron accelerators. A new accelerator put into operation at the Ukrainskiy fiziko-tekhnicheskiy institut (Ukrainian Physicotechnical Institute) is described, and problems in the dynamics of particles in linear electron accelerators are discussed. New methods are discussed for the extraction of particles from accelerators. Problems associated with the shaping of permanent magnetic fields and the acceleration of multicharge ions are also treated. The changeover of the series cyclotron to the phasotron acceleration mode with a view to increasing the energy of accelerated particles is described, and some problems connected with the bunching of particles are elaborated. No personalities are mentioned. References accompany each article.

TABLE OF CONTENTS:

81230
S/089/60/009/004/010/020
B006/B070

21.2100
26.2332

AUTHORS: Vorob'yev, A. A., Pokrovskiy, S. F.

TITLE: Comparison of Circuits of Cascade Generators for the Production of Large Currents With Small Pulsation

PERIODICAL: Atomnaya energiya, 1960, Vol. 9, No. 4, pp. 305 - 308

TEXT: For making exact measurements on thin targets in the energy range of 2 - 3 Mev, it is necessary that the particle energy be constant up to 0.1 - 0.5% for a beam current of the order of 5 - 10 ma. The authors have investigated the possibility of using for this purpose an electrostatic accelerator which works with a cascade generator of a power of up to 30 kw. They have compared the calculations of cascade-generator circuits according to different theories with one another and with experimental data. The formulas of calculations for four cascade generators are collected in Table 1. They are taken from papers of V. S. Melikhov, V. S. Novikovskiy, A. Bouwers, and the authors of the present "Letter to the Editor". Fig. 1 shows the dependence of the pulsation of the output potential δU on the number of stages n for a cascade generator with a

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84230

Comparison of Circuits of Cascade Generators for the Production of Large Currents With Small Pulsation

S/089/60/009/004/010/020
B006/B070

selenium rectifier, which has a charging current of 1 ma, an input potential of frequency 50 cps, and 2 - 7 stages. Fig. 2 shows the dependence of the fall in the output potential on n for a charging current of 2 ma for one and the same generator circuit. The results of comparison between the theoretical and experimental results are summarized as follows (the methods of calculation are named after their authors): 1) For a Cockcroft-Walton generator, the best agreement is obtained by using the formulas of Vorob'yev and Melikhov; 2) for calculating the voltage pulsation for a symmetric circuit, the best formula is that of Novikovskiy, and for a more exact calculation, that of Pokrovskiy; for calculating the fall of potential, the best formula is that of Novikovskiy and Pokrovskiy; 3) for a three-phase circuit, the best formula is that of Pokrovskiy. The properties of four types of cascade generator are compared in Table 2. This leads to the following conclusions: 1) The Cockcroft-Walton circuit is the simplest, but pulsation and voltage fall are large. 2) Cascade-generator circuits with capacitances which decrease linearly with the distance from the source of potential have 13 times less pulsation and 17 times less fall of

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Comparison of Circuits of Cascade Generators for the Production of Large Currents With Small Pulsation

S/089/60/009/004/010/020
B006/B070

potential compared to the Cockcroft-Walton circuit. 3) Symmetric circuits have 26 times less pulsation and a fourth of the potential fall compared to the Cockcroft-Walton circuit, and so these circuits have more rectifiers and capacitors. 4) The three-phase circuit is more complicated than the symmetric one, and has a smaller potential stability, more capacitors and rectifiers, but has the highest charging current possible (three times larger than that for the Cockcroft-Walton generator). There are 2 figures, 2 tables, and 3 references: 2 Soviet and 1 German.

SUBMITTED: March 4, 1960

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S/089/60/009/006/004/011
B102/B212

21,3000

AUTHORS: Surkov, Yu. A., Vorob'yev, A. A., Korolev, V. A., Vilenskiy, V. D.

TITLE: Investigation of the composition of urarium isotopes in rare-earth minerals

PERIODICAL: Atomnaya energiya, v. 9, no. 6, 1960, 477-482

TEXT: The authors have tried to find out whether the isotope Cm^{247} exists (or existed) in nature (it is produced during plutonium irradiation in a reactor). This isotope changes over into Pu^{243} with a half-life of the order of 10^8 years and finally into U^{235}. One may assume the following reaction chain $Cm^{247} \xrightarrow{\alpha} Pu^{243} \xrightarrow[5h]{\beta^-} Am^{243} \xrightarrow[8600\ a]{\alpha} Np^{239} \xrightarrow[2.3\ d]{\beta^-} Pu^{239} \longrightarrow$ $\xrightarrow[24400\ a]{\alpha} U^{235} \longrightarrow \ldots$, from the ratio U^{235}/U^{238} one could conclude that there still exists Cm^{247} in very old rare-earth minerals. The authors investigated the composition of uranium isotopes in xenotime, orthite and

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Investigation of the...

gadolinite with an age of $2 \cdot 10^9$ years. The samples had been furnished from the Mineralogicheskiy muzey AN SSSR (Mineralogy Museum of the AS USSR). The uranium was separated radiochemically from the minerals for an α-spectrometric analysis. The relative content of U^{235} and U^{238} was determined from the α-activity of these isotopes. An ionization chamber with screen (see Fig.2) had to be utilized since the uranium content was minute (0.25 - 1 mg). The chamber was filled with Ar + 0.5% CH_4; the α-radiating preparation was located on the high-voltage electrode. The α-particles will hit the collector electrode with a time delay of $t_{delay} = (d - R\cos\varphi)/w$ according to their direction of flight; R denotes the range of the α-particles, w the electron drift rate, d the distance between high-voltage electrode and screen, φ the angle between the direction of flight of the α-particle and the normal. The method of time collimation applied for the purpose consists in that only those pulses are recorded, for which $t_{delay} < t'$; thus, the pulses from α-particles emitted at small angles were eliminated. The degree of collimation was characterized by f ($f/w = t_{max} - t'$). The share Q of the recorded pulses from α-particles is given by $Q = 1 - f/R = N/N_o$, where N_o

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and N denote the intensities of a line before and after the collimation, respectively. The following has been measured: $Q = N_1/N_2$ (at two lines having the intensities N_1^0 and N_2^0) and

$$Q^0 = \frac{N_1^0}{N_2^0} = \frac{N_1}{N_2}\frac{1-\frac{1}{R_2}}{1-\frac{1}{R_1}} = Q\frac{1-\frac{1}{R_2}}{1-\frac{1}{R_1}} = QA, \quad (4).$$

Practically, there were three lines for the uranium isotopes.

$$Q^0_{234} = \frac{N^0_{234}}{N^0_{231}}, \quad Q_{234} = \frac{N_{234}}{N_{231}}, \quad Q^0_{235} = \frac{N_{235}}{N^0_{231}}.$$

$$Q_{235} = \frac{N_{235}}{N_{231}}.$$

The following holds

$$Q^0_{235} = Q_{235}A_{235} = Q_{235}\frac{Q_{235}}{Q_{235}} = \quad \cdots \quad P_{235} = \frac{Q_{235}-Q_{235}}{Q_{235}} = \frac{1}{1-\frac{1}{R_{235}}}\left(\frac{1}{R_{235}}-\frac{1}{R_{235}}\right). \quad (5a)$$

$$= Q_{235}\left(1+\frac{Q_{235}-Q_{235}}{Q_{235}}\right) = Q_{235}(1+P_{235}), \quad (5)$$

and analogously

$$Q^0_{234} = Q_{234}A_{234} = Q_{234}(1+P_{234}), \quad (6) \qquad P_{234} = \frac{1}{1-\frac{1}{R_{235}}}\left(\frac{1}{R_{235}}-\frac{1}{R_{234}}\right). \quad (6a)$$

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P_{235} and P_{234} are interrelated by

$$P_{235} = \frac{\frac{1}{R_{230}} - \frac{1}{R_{235}}}{\frac{1}{R_{230}} - \frac{1}{R_{234}}} P_{234} = \frac{R_{235} - R_{234}}{R_{234} - R_{238}} \frac{R_{234}}{R_{235}} P_{234} = bP_{234}. \quad (7)$$

$$b = \frac{R_{235} - R_{238}}{R_{234} - R_{238}} \frac{R_{234}}{R_{235}} \quad (8)$$

The ratio R_{234}/R_{235} had been determined from the range-energy curve as 1.135, b = 0.39. Finally using

$$A_{235} = (1 + bP_{234}) = [1 + b(A_{234} - 1)] = [1 + 0{,}39(A_{234} - 1)]. \quad (9)$$

the following expression is obtained for the correction coefficient A_{235}: $Q^{\circ}_{235} = Q_{235}[1 + 0.39(A_{234} - 1)]$. For a real degree of collimation $A_{235} \approx 1.20$ the error will be $\delta A_{235} \approx 0.1\ \delta b + 0.5\ \delta A_{234}$. b may be determined accurately to 5%. The measurements referred to a standard sample and $q = Q^{\circ}_{stand}/Q^{\circ}_{235}$ sample was determined. The background was negligibly

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small. It was possible to determine U_{235}/U_{238} with an error of ~2%. The test data are compiled in Table 1 (without collimation) and Table 2 (with collimation). It is apparent that the ratio of the isotopes was a little higher in gadolinite ($q \approx 1.046 \pm 0.02$). Here, it may be assumed that this raise is due to the existence of Cm^{247}. If its half-life is taken as $\gtrsim 4 \cdot 10^7$ a then it is possible to calculate the initial content of Cm^{247} in gadolinite (at a mean uranium content of 0.06%) which could have been $\gtrsim 10^{-3}$%. The authors thank A. P. Komar and V. I. Baranov for their interest in these investigations. There are 4 figures, 2 tables, and 7 references: 4 Soviet-bloc and 3 non-Soviet-bloc.

SUBMITTED: February 24, 1960

Card 5/8

83672

S/048/60/024/009/005/015
B013/B063

21.5300

AUTHORS: Vorob'yev, A. A., Korolev, V. A.

TITLE: The Operation of the Ionization Alpha Spectrometer Under High Loads

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960, Vol. 24, No. 9, pp. 1086 - 1091

TEXT: In the present paper, the authors suggest a method of raising the permissible loading of ionization chambers up to 10^4 pulses/sec. The duration of the pulses occurring in the ionization chamber depends on the duration of electron accumulation in it. By adding 10 ÷ 15% of methane to the argon and by shortening the distance q down to ~0.5 cm it is possible to shorten the duration of the build-up of pulses down to 0.5 - 0.4 μsec. It is apparently convenient to shape pulses by means of two short-circuited circuits. This method is particularly advantageous because pulse tails can be prevented and the constant component of the pulse spectrum is almost zero. The authors thoroughly studied the effect of the rise time on the

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83672

The Operation of the Ionization Alpha Spectrometer Under High Loads

S/048/60/024/009/005/015
B013/B063

pulse height (Fig. 1) and the signal-to-noise ratio (Figs. 2 and 3). The operation of the spectrometer under high load was checked by measuring the α-spectrum of a Pu^{238} source with an intensity of $8 \cdot 10^3$ pulses/sec. Besides, the spectrum of generator pulses was measured, which were supplied to the input of the amplifier together with the pulses of α-particles (Figs. 4 and 5). The α-spectrum of Pu^{238} is shown in Fig. 6. Its half-width was 60 kev. When analyzing the results obtained, the authors note that radio noise makes the largest contribution to the half-width line (45 kev). This noise can be largely reduced by switching on additional tubes. There is reason to believe that the half-width of the α-line can be reduced to at least 40 ÷ 50 kev. Some applications of a strongly loaded spectrometer are finally mentioned. The authors thank I. A. Fadeyev and M. F. Sobolevskaya for help in the work. There are 6 figures and 3 references: 2 Soviet and 1 British.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk SSSR (Institute of Physics and Technology of the Academy of Sciences USSR)

Card 2/2

83673

S/048/60/024/009/006/015
B013/B063

24.6810

AUTHORS: Vorob'yev, A. A., Komar, A. P., Korolev, V. A.

TITLE: Investigation of the Alpha Decay of U^{235} by Means of an Ionization Alpha Spectrometer

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960, Vol. 24, No. 9, pp. 1092-1098

TEXT: The present paper contains the results of an investigation of the α-decay of U^{235}, which was carried out by means of an ionization α-spectrometer. The spectrometer was tuned to a γ-spectrometer. The authors studied a spectrum without coincidence with γ-quanta (Figs. 1 and 2) and a series of γ-spectra coinciding with different groups of alpha particles (Figs. 3 and 4). A source enriched in U^{235} was used for the measurement. The spectral line of U^{234}(98%) showed, however, the highest intensity. It was used to stabilize the amplification factor of the amplifying part of the α-spectrometer. Besides, this line served as a standard for the

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Investigation of the Alpha Decay of U^{235} by Means of an Ionization Alpha Spectrometer

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measurement of the energies of U^{235} alphas. The energies, intensities, and forbiddances of the alpha groups are given in Table 1. The results of the analysis of the U^{235} α-spectrum agree with the results of Ghiorso although the latter are only of a qualitative character. The α-spectrum of U^{235} has been recently studied by S. A. Baranov and A. G. Zelenkov by means of a spectrometer of high luminous power. The energies of the lines they found are fairly consistent with the data obtained by the present authors. Table 2 gives the results of the determination of multipole or γ-transitions. On the basis of measurements of α- and γ-spectra, the authors suggest a possible α-decay scheme of U^{235} (Fig. 5). The levels were identified with the help of Nilsson's scheme. Though this identification cannot make a claim to finality, it does not contradict the experimental data available at present. The authors thank S. A. Baranov and A. G. Zelenkov for discussions and information, as well as M. F. Sobolevskaya for her assistance in the measurements. There are 5 figures, 2 tables, and 9 references: 3 Soviet, 3 US, and 1 Danish.

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VOROB'YEV, A.A.

82602

S/056/60/039/01/11/029
B006/B070

24.6520

AUTHORS: Vorob'yev, A. A., Komar, A. P., Korolev, V. A.

TITLE: Measurement of the Energy of the α-Particles of an Emitter

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 39, No. 1 (7), pp. 70-72

TEXT: The authors measured the α particle energies with the help of an α-spectrometer. The ionization was determined by comparing the pulse heights of the α particles with those of the generated pulses whose amplitude could be measured to an accuracy of ~ 0.01%. The chamber used was filled with 97% Ar and 3% CH_4. The width of the α line was 35 kev. Table 1 collects a number of relevant data. Th^{228} was chosen as a standard. In the first column of this table the energy values deduced by a magnetic analysis are given, the second column gives ionization I, and the third the energy calculated according to the formula (1) $(E_{st} - 84)/(E_\alpha - 84) = I_{st}/I_\alpha$, where E_{st} and E_α denote the α energies of the standard and the emitter under investigation. There is good

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Measurement of the Energy of the α-Particles of an Emitter

S/056/60/039/01/11/029
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agreement between the first and the third columns, from which the conclusion is drawn that the method of energy determination from the ionization in the α spectrometer is suitable. The following results are obtained:

At^{217}: 7.064 ± 0.005	Fr^{221}: 6.336 ± 0.005
Po^{213}: 8.368 ± 0.010	U_I^{235} : 4.396 ± 0.003
U_{II}^{235} : 4.211 ± 0.003	U^{238} : 4.190 ± 0.005

These values are compared with the results obtained by other authors. Agreement is good in some cases and not so good in others. Some particular cases in this connection are discussed. Thus, for example, the values obtained for the two intensive U^{235} lines (I and II) diverge considerably from those obtained by magnetic spectrometer (Ref. 6). In connection with this, it is pointed out that the measurements lately made by S. A. Baranov, A. G. Zelenkov et al. (Ref. 8) of the α spectrum of U^{235} with a new magnetic spectrometer led to the following values:

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E_I = 4.394 ± 0.002 and E_{II} = (4.213 ± 0.002) Mev, and these agree very well with those obtained in the present work. There are 2 tables and 9 references: 1 Soviet, 1 South African, 2 Canadian, and 5 American.

ASSOCIATION: Leningradskiy fiziko-tekhnicheskiy institut Akademii nauk SSSR (Leningrad Physicotechnical Institute of the Academy of Sciences, USSR)

SUBMITTED: March 22, 1960

Card 3/3

S/120/61/000/002/010/042
E032/E114

AUTHORS: Vorob'yev, A.A., and Korolev, V.A.

TITLE: A method for measuring the transparency coefficient of a grid in a pulse ionization chamber

PERIODICAL: Pribory i tekhnika eksperimenta, 1961, No.2, pp. 78-80

TEXT: Green's reciprocity theorem can be used to determine the potential V^+ induced on the collecting electrode by positive ions. The latter is due to the fact that the grid introduced to screen the collector is not 100% efficient. The present authors point out that the theoretical treatment of the problem given by O. Buneman, T.E. Cranshaw and J.A. Harvey (Ref.1: Canad. J.Res.A, 1949, 27, 191) is very complicated and, moreover, is based on various simplifying assumptions. They therefore suggest a method for the experimental determination of the grid transparency coefficient. Their argument runs as follows. The potential V^+_i induced by the i-th positive ion located at a distance x from the electrode 1 (Fig.1) can be shown to be given by:

$$V^+_i = e\,\varphi\,(x)/CU \qquad (2)$$

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A method for measuring the transparency coefficient of a grid in a pulse ionization chamber

where $\varphi(x)$ is the potential at the point x, which appears under the following conditions. The high-voltage electrode and the grid are earthed, the collecting electrode is at a potential U, and there is no space charge. The potential distribution in this case is shown in Fig.1. We are interested in the region between the high-voltage electrode and the grid. At a sufficient distance from the grid the field E_d is a constant, in which case

$$\varphi(x) = E_\alpha x \qquad (3)$$

The potential V^+ is then given by

$$V^+ = \sum_{i=1}^{N} V_i^+ = Ne\,\bar{R}\cos\theta\, E_d/CU \qquad (4)$$

where $\bar{R}$ is the average distance of the ions from the beginning of the track and θ is the angle between the direction of the track and the normal to the surface of the electrodes. In order to determine E_d the chamber is filled with pure argon and a high

A method for measuring the .....

voltage is applied to the collecting electrode (U = 2 kV) while the grid and the high-voltage electrode are earthed. The pressure in the chamber is adjusted so that alpha particles emitted from a source mounted on the high-voltage electrode stop within the region in which the field is still constant. The field E_d which penetrates beyond the grid extracts a fraction of electrons produced by ionization and pulses appear on the collecting electrode. Next, a compensating positive voltage ΔU is applied to the high-voltage electrode and is adjusted until there are no pulses at the collecting electrode. The pulses disappear when the compensating field E'_d and E_d are equal, i.e.

$$E'_d = E_d = \Delta U/d \qquad (5)$$

where d is the distance between the high-voltage electrode and the grid. Hence

$$V^+ = Ne\ \Delta U\ \bar{R} \cos\theta/CU\ d \qquad (6)$$

Thus, in order to determine V^+ it is sufficient to carry out a simple experiment involving the determination of the compensating voltage ΔU. The authors recommend pure argon as the working

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gas. Best results are obtained by determining the compensation point using pulses from the high-voltage electrode, since in this case the sign of the pulses will change at the balance point. In this way an accuracy of 3-5% in $\Delta U/U$ can be achieved. The experimental results are found to be in agreement with those computed by Buneman and Cranshaw and Harvey (Ref.1) (see Table), the discrepancy between the experimental data and the theory being negligible in the case of grids with low transparency.

Acknowledgements are expressed to A.P. Komar for interest in this work and to G.Ye. Solyakin for taking part in the discussions.

There are 2 figures, 1 table and 2 references: 1 Soviet and 1 English.

ASSOCIATION: Leningradskiy fiziko-tekhnicheskiy institut
(Leningrad Physico-technical Institute)

SUBMITTED: March 24 1960

grid	r, mm	r, mm	r, mm	$\sigma_{calc.}$	$\sigma_{exp.}$
1	0.05	1.5	58	0.0065	0.0061
2	0.05	3.0	58	0.0185	0.0143

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E032/E114

A method for measuring the transparency coefficient of a grid in a pulse ionization chamber

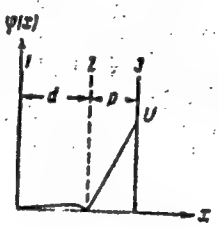

Fig.1

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27594

S/120/61/000/004/003/034
E032/E514

24.6800

AUTHORS: Vorob'yev, A.A. and Korolev, V.A.

TITLE: A study of the properties of an argon-methane mixture as the working gas of an ionization chamber

PERIODICAL: Pribory i tekhnika eksperimenta, 1961, No.4, pp.42-46

TEXT: W. N. English and G. C. Hanna (Ref.1: Canad.J.Phys., 1953, 31, 768) have recommended argon-methane mixtures as a suitable working gas for ionization chambers. The present authors report some measurements of the properties of such chambers. All the measurements were carried out with a plane ionization chamber containing a grid. The gas mixture was made up of commercial argon (Ar - 99.9%, O_2 - 0.02%, N_2 - 0.08%, CO_2 - 0.005%) and commercial methane. The following quantities were measured: 1) Electron drift velocity, 2) the recombination rate, 3) the magnitude of the saturating field, 4) the electron attachment effect and the maximum permissible field, 5) the average energy of the electrons in the gas and 6) the dependence of the ionization on the energy of α-particles traversing the chamber. It was found that with this gas mixture it is possible to choose the electrode potentials so that:

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A study of the properties of ... S/120/61/000/004/003/034
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1) the recombination effects (between electrons produced during the ionization and the corresponding positive ions) are reduced to a minimum; 2) there is no appreciable attachment of electrons to neutral molecules and 3) the electrons can pass freely through the intermediate grid. The electron collection time can easily be reduced to 1-0.5 μsec and a plateau of several hundred volts is obtained, e.g. with a methane concentration of 5% the collection time is approximately 0.7 μsec. The ionization was found to be a linear function of α-particle energy in the range 5.4-8.8 MeV. An important advantage of the argon-methane mixture is that it does not require any additional purification. Acknowledgments are expressed to A. P. Komar for his interest in this work and to M. F. Sobolevskaya for assistance with the measurements.
There are 5 figures, 1 table and 8 references: 3 Soviet (1 a translation from English) and 5 non-Soviet. The following English-language references are given: Ref.1 (quoted in text), Ref.5: C. E. Melton, G. S. Hurst, T. E. Bortner, Phys.Rev.,1954, 96, 643; Ref.6: G. Bertolini, M. Bettoni, A. Bisi, Phys. Rev., 1953, 92, 1586; Ref.7: D. Strominger, T.M. Hollander, G. T. Seaborg, Rev. Mod. Phys., 1958, 30, 2.

Card 2/[illegible]

A study of the properties of ...

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S/120/61/000/004/003/034
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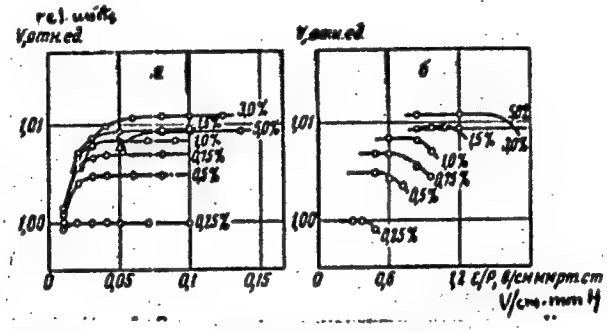
ASSOCIATION: Fiziko-tekhnicheskiy institut AN SSSR
(Physico-technical institute AS USSR)

SUBMITTED: March 24, 1960

Fig.3: Amplitude V of pulses at the collecting electrode on:
a - p.d. between high-voltage electrode and the grid and
б - p.d. between the grid and the collector, (methane concentrations are marked on the curves.



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88402

B/020/61/136/004/008/026
B019/B056

26.2312

AUTHORS: Komar, A. P., Academician of the AS UkrSSR, Vorob'yev, A. A., and Korolev, V. A.

TITLE: Measurement of the Fluctuation of Ionization Produced by α-Particles in Argon

PERIODICAL: Doklady Akademii nauk SSSR, 1961, Vol. 136, No. 4, pp. 795 - 797

TEXT: In the introduction, the authors refer to the frequently used measurement of ionization caused by nuclear particles for the purpose of determining the energy of nuclear particles. A relation given by V.Fano (Ref.1) for the mean square fluctuation of the number of ion pairs with constant energy of the ionizing particles is written, and it is found that this formula is suited for determining the upper limit of the mean fluctuation, but not for more exact computations. Besides, Fano assumed that the ratio between the probabilities of the various inelastic processes is independent of the nature and energy of the ionizing particles. The measurements carried out by the authors were made by means

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Measurement of the Fluctuation of Ionization Produced by α-Particles in Argon

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of α-particles emitted by Ra^{224} (E_α = 5.681 Mev) and of α-particles emitted by Fr^{221} (E_α = 6.336 Mev). The ionization chamber was filled with chemically pure argon + 1.5% CH_4, whereby recombination could be prevented under certain conditions. Electronic collimation was used, whereby the resolution and, thus, the quality of the spectrum could be improved. The electronic means for improving the signal-to-noise ratio are briefly described. The measurements are graphically represented in Figs.1 and 2. The half-width of the Ra^{224} α-line is 17 kev and has a mean fluctuation of 7.2 kev. This mean fluctuation δ is composed of $\delta = \sqrt{\delta_N^2 + \delta_p^2 + \delta_o^2}$, where δ_N, δ_p, δ_o are the mean fluctuations which are due to the fluctuations of the ionization, to radio noise, and to other causes. In the case of Ra^{224}, δ_o is negligibly small, and because δ_p = 4.7 kev, it follows that: δ_N = 5.5 kev. For Fr^{221}, δ_N = 6.0 kev was obtained. From a discussion of the results, the authors conclude that δ_N may be described by

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Measurement of the Fluctuation of Ionization Produced by α-Particles in Argon

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$$\delta_N(E_\alpha) = 5.8\sqrt{E_\alpha/6.0} \qquad (4)$$

for different E_α. E_α must be given in Mev. In the relation $\delta_N^2 = FN_o$ (1) given by Fano, where N_o is the mean number of ion pairs, F is found equal to 0.22, and its upper limit is given as $F_{lim} = 0.33$. The authors thank M. F. Sobolevskaya for her help in carrying out the measurements. There are 2 figures and 8 non-Soviet references: 5 US, 1 Canadian, 1 German, and 1 French.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk SSSR (Institute of Physics and Technology, Academy of Sciences USSR)

SUBMITTED: November 1, 1960

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88402

S/020/61/136/004/008/026
B019/B056

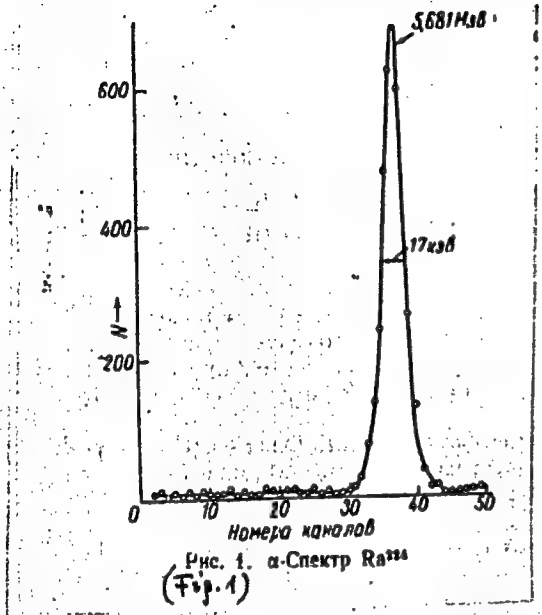
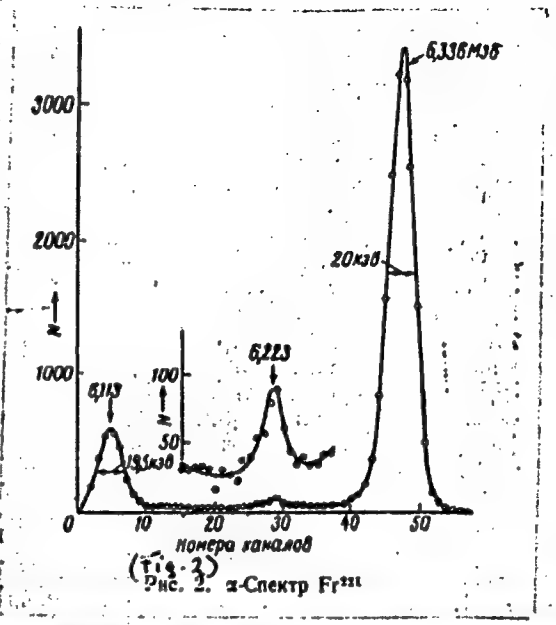


Рис. 1. α-Спектр Ra^{224}
(Fig. 1)



(Fig. 2)
Рис. 2. α-Спектр Fr^{221}

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20318

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B104/B209

9,9100 (and 1041.)
26.2312

AUTHORS: Vorob'yev, A. A., Komar, A. P., Academician AS UkrSSR, and Korolev, V. A.

TITLE: The possibilities of reducing the effect of ionization fluctuations in gases

PERIODICAL: Doklady Akademii nauk SSSR, v. 137, no. 1, 1961, 54-57

TEXT: The authors based their work on a paper by Fano (Ref. 1: U. Fano, Phys. Rev., 72, 26 (1947)), in which an expression was obtained for the mean square fluctuations of the number of ion pairs at a constant energy of the ionizing particles. Fano's calculations show that these fluctuations are determined chiefly by the redistribution of ionized and excited atoms. Evidently, their total amount fluctuates less. The authors have now determined the amount of fluctuations of the total ionization, taking Fano's method as a basis. In this manner, they obtained the mean square fluctuation δ_J^2 of the total ionization $\overline{J}$:

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The possibilities of reducing ...

$\delta_J = \frac{A^2}{N_0 P}\overline{\left(n_k - \frac{E_k}{W}\right)^2} = \frac{F}{N_0}$. N_0 denotes the mean number of ion pairs, $W = W_0/(1 + \sigma(1-\beta)/P) = W_0 A$, $P = \sum p_k^i$ the total probability of ionization in inelastic collision, W_0 the mean energy of ion pair production without additional ionization, and n_k the number of ions produced in the k-th collision. The relations

$$F = \Phi(\sigma) + \frac{1}{PW_0^2}\left[\sum_{\text{non}} P_k^i (W_i - E_k^i)^2 + \sum_{\text{воз6}} P_k^a (W_a - E_k^a)^2\right]; \quad (8a) \quad (8a)$$

$$\Phi(\sigma) = \frac{1}{W_0^2}\left[(W - W_i)^2 + \sigma\frac{1-P}{P}(W - W_a)^2 + \frac{1-P}{P}(1-\sigma)W_a^2\right]. \quad (8б) \quad (8b)$$

are obtained for F. The last two terms in (8a) are due to fluctuations of the energy losses during ionization and excitation, and do not depend

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on the additional ionization. $\Phi(\sigma)$ is determined by the redistribution of the number of ionized and excited atoms, as well as by the fluctuations arising in the additional ionization. In the limiting case where additional ionization is missing ($\sigma = 0$), Eq. (8a) goes over into the formula of Fano. Fig. 1 shows the ratio $\Phi/\mathcal{C}_0$ as depending on the probability σ of additional ionization for He and Ar. It is seen that $\Phi(\sigma)$ for argon drops to nearly one-thirtieth with rising probability, and for helium it drops to nearly one-hundredth. The first of the terms appearing in (8a) was found to be always about 0.03, and the second is negligible. From this it follows that the accuracy of measurement of the energy of ionizing particles is considerably improved by recording all ionized and excited atoms. There are 1 figure and 3 non-Soviet-bloc references.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk SSSR
(Institute of Physics and Technology of the Academy of Sciences USSR)

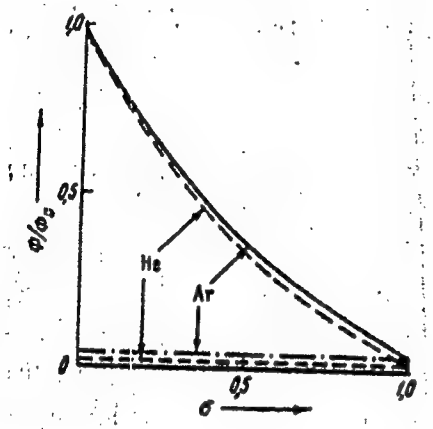
Card 3/4

20318

S/020/61/137/001/009/021
B104/B209

The possibilities of reducing ...

SUBMITTED: December 9, 1960



Card 4/4

VOROB'YEV, A.A.; DIDENKO, A.N.

Use of pin-type moderator systems in acceleration technique.
Atom. energ. 12 no.3:242-243 Mr '62. (MIRA 15:2)
(Particle accelerators)

39479
S/056/62/043/002/009/053
B102/B104

AUTHORS: Vorob'yev, A. A., Komar, A. P., Korolev, V. A.

TITLE: Decrease of ionization fluctuations of α-particles in argon

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43, no. 2(8), 1962, 426-428

TEXT: The authors had shown earlier (DAN SSSR, 137, 54, 1961) that the ionization fluctuations associated with redistributions of the numbers of excited and ionized molecules can be reduced by adding a gaseous impurity with an ionization potential lower than the energy of the lowest excited level of the principal component. Here, the authors tried to check this possibility by experiment. They used a pulsed ionization chamber filled with argon containing 0.17 % N_2, 0.02 % O_2, and an acetylene impurity. As its ionization potential of 11.35 ev is lower than the lowest argon level (11.5 ev), the acetylene addition increases the ionization. The ionization fluctuations were calculated from the half-width of the α-line (E_α = 5.681 Mev) of Ra^{224}; for comparison, the measurements were repeated

Card 1/2

Decrease of ionization...

S/056/62/043/002/009/033
B102/B104

on Ar + 1 % CH_4.

	ΔE_α, kev	ΔE_{fl}, kev	ΔE_N, kev	ΔN	N	F
Ar+1% CH_4	8.1	5.8	5.7	216	215000	0.22
Ar+0.8% C_2H_2	6.0	4.7	3.7	175	268000	0.09

where ΔE_α = total root-mean-square pulse-height fluctuations, ΔE_{fl} = root-mean-square pulse-height fluctuations due to electronic noise, ΔE_N = the same due to fluctuations in the number of ion pairs, N = total number of ion pairs, ΔN = root-mean-square fluctuation in the number of ion pairs; F is determined by $\Delta N/N = \sqrt{F/N_o}$; N_o = 212,000 ion pairs. The maximum half-width of the α-line was 8.7 kev. There are 1 figure and 1 table.

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. F. Ioffe Akademii nauk SSSR (Physicotechnical Institute imeni A. F. Ioffe of the Academy of Sciences USSR)

SUBMITTED: March 13, 1962

Card 2/2

ACCESSION NR: AP4020312 S/0139/64/000/001/0173/0177

AUTHOR: Vorob'yev, A. A.

TITLE: Investigations in betatron physics reported in the 1962 Bucharest colloquium on construction and application of betatrons

SOURCE: IVUZ. Fizika, no. 1, 1964, 173-177

TOPIC TAGS: betatron, bremsstrahlung radiation, accelerated electron, radiation intensity, equilibrium orbit, field decay, air gap, electromagnet, beam focusing, betatron TPI

ABSTRACT: The highlights of the colloquium on betatron physics held in Bucharest during 14-20 November 1962 are reported. Soviet Russia, Germany, Yugoslavia, Poland, Rumania, and Hungary participated. Some noteworthy papers were presented by Professor E. Eckard of Jena University, Professor A. A. Vorob'yev of Tomsk Polytechnic Institute, and Engineer K. Iliyesku. Professor Ekkard spoke on improved betatron operation reliability, improved bremsstrahlung radiation from targets, regulation, measurement and stability of betatron end energy, and accelerated electron input beams. A detailed description is given of the 25 Mev Rumanian betatron with 42 roentgen/m/min radiation intensity, equilibrium orbit radius of 250 mm,

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ACCESSION NR: AP4020312

field decay index of 0.75, air gap of 67.4 x 78 mm, electromagnet weight of 3 tons, supply voltage of 5.3 kv, and vacuum of 1 to 5 torr. The ceramic chamber is shown to have an elliptic cross section. Several papers by Iliyesku and his co-workers included topics on magnetic field characteristics, weak and strong beam focusing techniques, air gap studies, accurate field decay measurements, and improved betatron emission. Geske and Schmaltz of the German Democratic Republic outlined the design of a 30 Mev betatron under construction. A. Brinshek of Yugoslavia reported on the automatic matching technique for supply voltage and frequency in the Yugoslavian 31-Mev betatron. Burger, Rudolph, Plitz, Koshma, Lungu, Simionescu, I. Leybovich, S. Haltrich, V. Grechescu, Klapper, Bezich, Yamnik, Kernel, Schneider, Vaksel', Shtern also participated. Various problems for future consideration were discussed. Orig. art. has: 2 figures.

ASSOCIATION: Tomskiy politekhnicheskiy institut imeni S. M. Kirova (Tomsk Polytechnic Institute)

SUBMITTED: 06May63 DATE ACQ: 31Mar64 ENCL: 00

SUB CODE: NP NO REF SOV: 000 OTHER: 000

Card 2/2

ACCESSION NR: AP4036575 S/0139/64/000/002/0168/0169

AUTHOR: Vorob'yev, A. A.

TITLE: Selective mechanical failure under acoustic compression or dilation waves on composition of materials having different hardnesses

SOURCE: IVUZ. Fizika, no. 2, 1964, 168-169

TOPIC TAGS: dynamic load, modulus of elasticity, mechanical failure, acoustic wave, compression wave

ABSTRACT: The author discusses the fact that under dynamic loads the failure rate in stronger substances is greater than in weaker substances. Consequently, the elastic wave propagation (compression or dilation) is faster in the stronger substances (with a higher modulus of elasticity) than in the weaker ones. It is argued that when a material of compound composition, comprising a mixture of strong and weak zones, is subjected to dynamic loading, its weak parts will not reach the failure stage before the load on the stronger zones exceeds the elastic limit and causes complete failure of these stronger zones. It is believed that

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ACCESSION NR: AP4036575

this phenomenon can be used to generate selective failure in multicomponent substances (such as rocks) under dynamic mechanical loads introduced by an acoustic compression or dilation wave. Acoustic waves are particularly applicable to this work because their propagation time is similar to the failure rate of the material.

ASSOCIATION: Tomskiy politekhnicheskiy institut imeni S. M. Kirova (Tomsk Polytechnical Institute)

SUBMITTED: 25Jul63

ATD PRESS: 3078

ENCL: 00

SUB CODE: ME

NO REF SOV: 001

OTHER: 000

Card 2/2

ACCESSION NR: AP4033111 S/0120/64/000/002/0069/0071

AUTHOR: Alkhazov, G. D.; Vorob'yev, A. A.; Korolev, V. A.; Seliverstov, D. M.

TITLE: Simple counting unit for a slow multichannel analyzer

SOURCE: Pribory* i tekhnika eksperimenta, no. 2, 1964, 69-71

TOPIC TAGS: pulse height analyzer, multichannel pulse height analyzer, slow multichannel analyzer, pulse counter, pulse counting unit

ABSTRACT: A simple counting unit intended for low (up to 100 pulse/sec) counting rates is described. The unit is recommended for long-duration few-pulse applications where reliability is the main requirement. The 32-tube counting unit was used in a 20-channel time analyzer and tested for several months under actual operating conditions. The a-c line supply voltage is stabilized by a ferroresonance stabilizer only; variation of the plate voltage

Card 1/2

ACCESSION NR: AP4033111

within 200—250 v does not result in false operation. The power consumption is 200 w. A simplified connection diagram is shown and explained in the article. Orig. art. has: 1 figure.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN SSSR (Physicotechnical Institute, AN SSSR)

SUBMITTED: 20Apr63 ATD PRESS: 3060 ENCL: 00

SUB CODE: EC NO REF SOV: 000 OTHER: 000

Card 2/2

ACCESSION NR: AP4039734 S/0141/64/007/002/0338/0342

AUTHOR: Vorob'yev, A. A.; Bezmaterny*kh, L. N.; Didenko, A. N.; Lisitsy*n, A. I.; Ol'shanskiy, A. P.

TITLE: Laminated dielectric coatings with large reflection coefficients

SOURCE: IVUZ. Radiofizika, v. 7, no. 2, 1964, 338-342

TOPIC TAGS: dielectric coating, reflection coefficient, cavity resonator, microwave equipment, dielectric permittivity

ABSTRACT: In view of various applications of laminated dielectric coating with large reflection coefficients, their reflecting properties are analyzed on the basis of a calculation of the reflection coefficient from a semi-infinite periodic medium, comprising an infinite waveguide of arbitrary cross section, one half of which is filled with dielectric layers. Such a representation neglects the reflection from the second boundary of the layer and is justified at the frequencies considered. The field outside the outermost layer is then described as a sum of incident and reflected waves, and inside the layer by a wave traveling inside the dielectrics. Calculations show that for a given reflection coefficient the dimensions of the laminated coating decrease sharply with increasing dielectric con-

Card 1/4

ACCESSION NR: AP4039734

stant of the layers, and in the case of large dielectric constants (e. g., barium titanate), such layers can be used not only in the optical but also in the microwave bands. It is shown that a frequency exists at which the tangential electric field on the surface of the laminated medium vanishes, making it possible in some cases to replace metallic walls of cavity resonators by laminated dielectrics without distorting the field structure in the cavity. Tests of laminated dielectric consisting of alternating layers of paraffin and foamed plastic placed in a rectangular waveguide confirmed this assumption, and the cavity produced by shorting the ends of this waveguide had approximately the same Q as a metal cavity. Slight deviations from theory are explained. The use of dielectrics with large permittivities (10^2 -- 10^3) will make it possible to reduce the total thickness of the sandwich to 1 — 2 cm in the 10-cm band and to several tenths of a millimeter in the millimeter band. Orig. art. has: 2 figures and 11 formulas.

ASSOCIATION: None

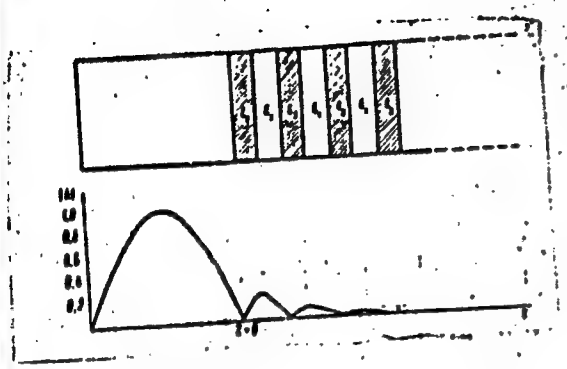
SUBMITTED: 20May63 ENCL: 02

SUB CODE: EM, MT NR REF SOV: 003 OTHER: 04

Card 2/4

ENCLOSURE: 01

ACCESSION NR: AP4039734

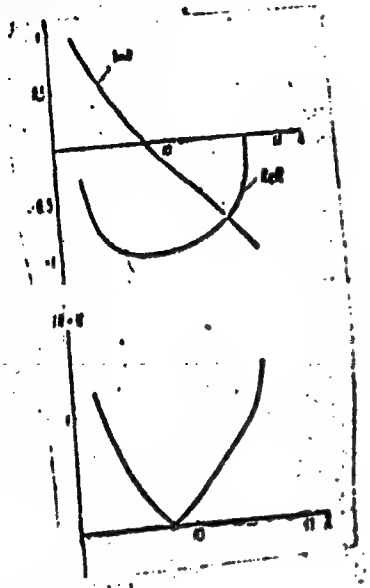


Distribution of electric field in a stratified medium, for R = 1, λ = 10 cm, ε_2 = 10, ε_1 = 1, L_2 = 1.2 cm (H_{01} mode). (R - reflection coeffic., λ - wavelength, ε - dielectric const., L - thickness)

Card 3/4

ACCESSION NR: AP4039734

ENCLOSURE: 02



Dependence of the reflection coefficient on the wavelength within the rejection band, at $\varepsilon_2 = 2$, $\varepsilon_1 = 1$, $L_2 = 2.8$ cm, $L_1 = 2$ cm, a = ~~7.2~~ cm (H_{01} mode). (a - width of waveguide)

Card 4/4

ACC NR: AP7005707 SOURCE CODE: UR/0089/67/022/001/0003/0006

AUTHOR: Vorob'yev, A. A.; Didenko, A. N.; Ishkov, A. P.; Kolomenskiy, A. A.; Lebedev, A. N.; Yushkov, Yu. G.

ORG: none

TITLE: Investigation of autoresonant method of particle acceleration by electromagnetic waves

SOURCE: Atomnaya energiya, v. 22, no. 1, 1967, 3-6 ACCELERATION

TOPIC TAGS: particle acceleration, magnetic resonance, electron waveguide, electron accelerator, ELECTROMAGNETIC WAVE

ABSTRACT: This is a continuation of earlier work (in: Trudy Mezhdunarodnoy konferentsii po uskoritelyam [Trans. Internat. Conf. on Accelerators] (Dubna, 1963), M., Atomizdat, 1964, p. 1030, and earlier papers) which demonstrated the feasibility of resonant acceleration of particles by a transverse wave in a longitudinal magnetic field under suitable conditions. The present paper contains the results of an experimental investigation of this method of acceleration. In view of the limited possibility of obtaining the required strong field in a large volume, the study is confined to acceleration by 10-cm electromagnetic waves inside a straight smooth waveguide (H_{11} and H_{10} modes). Equations are derived for the angular velocity and phase of a particle accelerated in such a structure, and for the length of the waveguide over which the particle energy will increase. The accelerating system was a

UDC: 621.384.62

Card 1/2

ACC NR: AP7005707

rectangular waveguide (72 x 44 mm) for the H_{10} mode or a 76-mm diameter round waveguide for the H_{11} mode. The length of the waveguide ranged from 150 to 1000 mm. Pulsed microwave power (not more than 600 kw) (3000 MHz) was fed in 3-μsec pulses at a repetition frequency of 50 Hz. The 1000-oe dc field was produced with a solenoid. The particle energy was determined from the deceleration produced by aluminum foils and reached 700 kev, at an electric field intensity of 3—5 kv/cm, which is higher than obtainable by ordinary cyclotron acceleration. The ancillary tests made on the equipment are briefly described. The experimental data agree with the earlier theoretical predictions and it is concluded that the autoresonant mechanism can be used for effective injection of particles into magnetic traps. Orig. art. has: 1 figure and 9 formulas. [02]

SUB CODE: 20/ SUBM DATE: 05Sep66/ ORIG REF: 006/ ATD PRESS: 5117

Card 2/2

ACC NR: AT7003986 SOURCE CODE: UR/0000/66/000/000/0005/0010

AUTHOR: Vorob'yev, A. A.; Kalganov, A. F.; Lukutin, V. A.; Patsevich, V. V.

ORG: Tomsk Polytechnic Institute (Tomskiy politekhnicheskiy institut)

TITLE: Theory and technology of electrostatic machines

SOURCE: Mezhvuzovskaya konferentsiya po elektronnym uskoritelyam. 5th, Tomsk, 1964. Elektronnyye uskoriteli (Electron accelerators); trudy konferentsii. Moscow, Atomizdat, 1966, 5-10

TOPIC TAGS: electrostatic generator, particle acceleration, electronic test equipment

ABSTRACT: The phenomena transpiring in the electrostatic generator and their analogy to the phenomena in the electromagnetic generator are briefly reviewed (e.g., D. Gignoux, "Electrostatic generators for space application", 102-ème Colloque du SNRC, Grenoble, 1960). Formulas for maximum power of disk-type and cascaded-conveyer generators show that the maximum specific power (per unit volume or weight) is inversely proportional to the stator-rotor gap; the load voltage and current are independent of the gap. Small gaps are preferable because they mean smaller spurious capacitance, and the available power becomes closer to its theoretical value. The latter statement was proved theoretically and experimentally, on a single-disk generator, at the NII of Nuclear Physics, Tomsk Polytechnic Institute. An electrostatic generator with parallel-connected poles and vacuum insulation seems to be most promising. Orig. art. has: 8 formulas.

Card 1/1 SUB CODE: 09 / SUBM DATE: 06Mar66 / ORIG REF: 003 / OTH REF: 003

ACC NR: AT7003994 SOURCE CODE: UR/0000/66/000/000/0075/0082

AUTHOR: Vorob'yev, A. A.; Bazmaternykh, L. N.; Didenko, A. N.; Filatova, R. M.

ORG: Scientific Research Institute of Nuclear Physics, Electronics, and Automation, Tomsk Polytechnic Institute (Nauchno-issledovatel'skiy institut yadernoy fiziki, elektroniki i avtomatiki pri TPI)

TITLE: Waveguide accelerating systems with walls not shielding the control magnetic field

SOURCE: Mezhvuzovskaya konferentsiya po elektronnym uskoritelyam. 5th, Tomsk, 1964. Elektronnyye uskoriteli (Electron accelerators); trudy konferentsii. Moscow, Atomizdat, 1966, 75-82

TOPIC TAGS: waveguide, ~~accelerator~~, cyclic accelerator, particle acceleration

ABSTRACT: A multilayer-dielectric coating similar to that used in Fabry-Perot interferometers (W. Gulshaw, Proc. Phys. Soc., London, v. 66, sec. B, 597, 1953) and in lasers (J. Franklin Inst., 273, 177, 1962) is proposed for the walls of waveguide-type accelerators. Uniformly bent smooth and septate closed

Card 1/2

ACC NR: AT7003994

rectangular waveguides with multilayer-dielectric walls are theoretically and experimentally investigated. Formulas for the rejection frequency of a periodic multilayer structure, for attenuation, and for the total electromagnetic-wave losses due to reflection from a multilayer dielectric are derived. A length of standard 72 x 34-mm waveguide whose ends were closed by multilayer-dielectric walls was excited by TE_{101} -mode at $\lambda = 10,182$ cm; at room temperature, $Q = 1800$. Findings: (1) At a fixed frequency, the field structure in the above system does not differ from that in an all-metal system; (2) Use of TE-modes is preferable; inside the multilayer wall, the field attenuates rapidly; with proper selection of wall parameters, no hazard of dielectric breakdown by SHF high power will exist; (3) The above multilayer-dielectric walls are feasible if Sr and Ba titanates are used as materials (see R. O. Bell et al., IRE Trans., MTT-9, 239, 1961). Orig. art. has: 3 figures, 15 formulas, and 1 table.

SUB CODE: 09 / SUBM DATE: 06Mar66 / ORIG REF: 001 / OTH REF: 003

Card 2/2

ACC NR: AT7003986 SOURCE CODE: UR/0000/66/000/000/0005/0010

AUTHOR: Vorob'yev, A. A.; Kalganov, A. F.; Lukutin, V. A.; Patsevich, V. V.

ORG: Tomsk Polytechnic Institute (Tomskiy politekhnicheskiy institut)

TITLE: Theory and technology of electrostatic machines

SOURCE: Mezhvuzovskaya konferentsiya po elektronnym uskoritelyam. 5th, Tomsk, 1964. Elektronnyye uskoriteli (Electron accelerators); trudy konferentsii. Moscow, Atomizdat, 1966, 5-10

TOPIC TAGS: electrostatic generator, particle acceleration, electronic test equipment

ABSTRACT: The phenomena transpiring in the electrostatic generator and their analogy to the phenomena in the electromagnetic generator are briefly reviewed (e.g., D. Gignoux, "Electrostatic generators for space application", 102-ème Colloque du SNRC, Grenoble, 1960). Formulas for maximum power of disk-type and cascaded-conveyer generators show that the maximum specific power (per unit volume or weight) is inversely proportional to the stator-rotor gap; the load voltage and current are independent of the gap. Small gaps are preferable because they mean smaller spurious capacitance, and the available power becomes closer to its theoretical value. The latter statement was proved theoretically and experimentally, on a single-disk generator, at the NII of Nuclear Physics, Tomsk Polytechnic Institute. An electrostatic generator with parallel-connected poles and vacuum insulation seems to be most promising. Orig. art. has: 8 formulas.

Card 1/1 SUB CODE: 09 / SUBM DATE: 06Mar66 / ORIG REF: 003 / OTH REF: 003

VOROB'YEV, A.A.; DIDENKO, A.N.; KOVALENKO, Ye.S.

Wave-guide cyclic electron accelerator. Izv. TPI 100: 162-169 '62. (MIRA 18:9)

VASIL'YEV, N.N.; VORONTSOV, I.V.; VOROB'YEV, A.A.

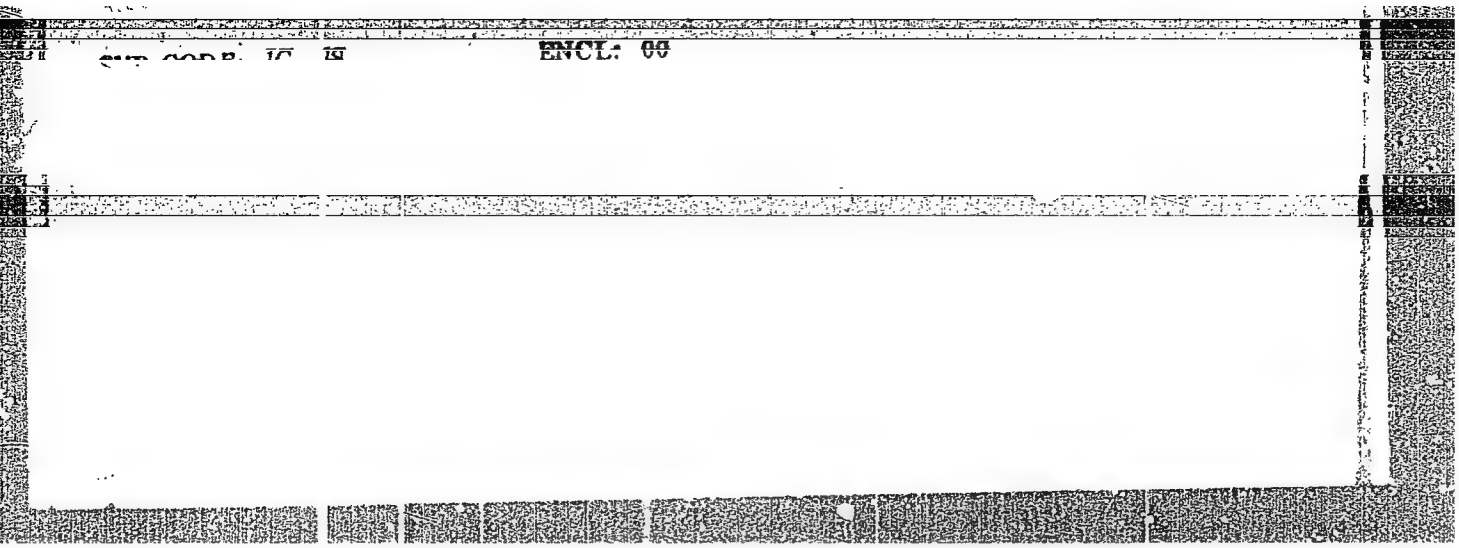
Possibility of a partial restoration of specific toxicity in biologically harmless botulin anatoxins following treatment with substances depriving them of formaldehyde. Vak. i syv. no.1:27-39 '63. (MIRA 18:8)

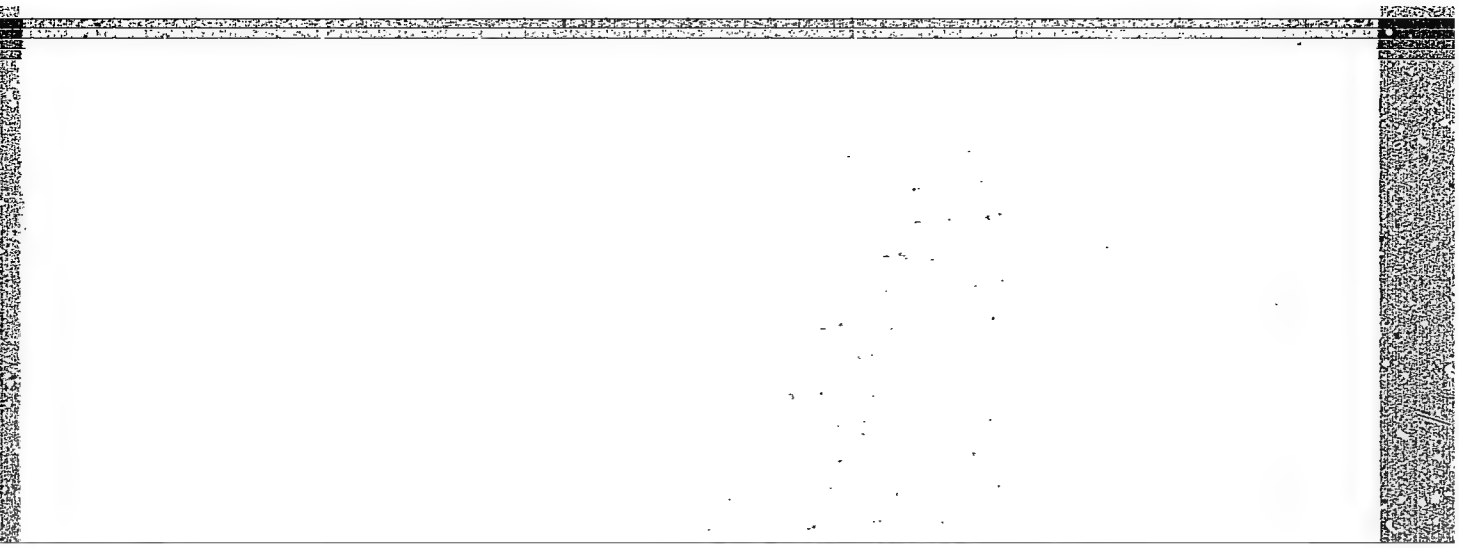
VOROB'YEV, A.A.; DIDENKO, A.N.; LISITSYN, A.I.; MOROZOV, B.N.; POTEKHIN, Yu.I.; SALIVON, L.G.; FILATOVA, R.M.

A 10-Mev. wave-guide type synchrotron. Atom. energ. 18 no.6:633-634 Je '65. (MIRA 18:7)

VOROB'YEV, Anatoliy Andreyevich; VASIL'YEV, Nikolay Nikolayevich; KRAVCHENKO, Anatoliy Timofeyevich; ANAN'YEV, V.A., red.

[Anatoxins] Anatoksiny. Moskva, Meditsina, 1965. 487 p. (MIRA 18:10)





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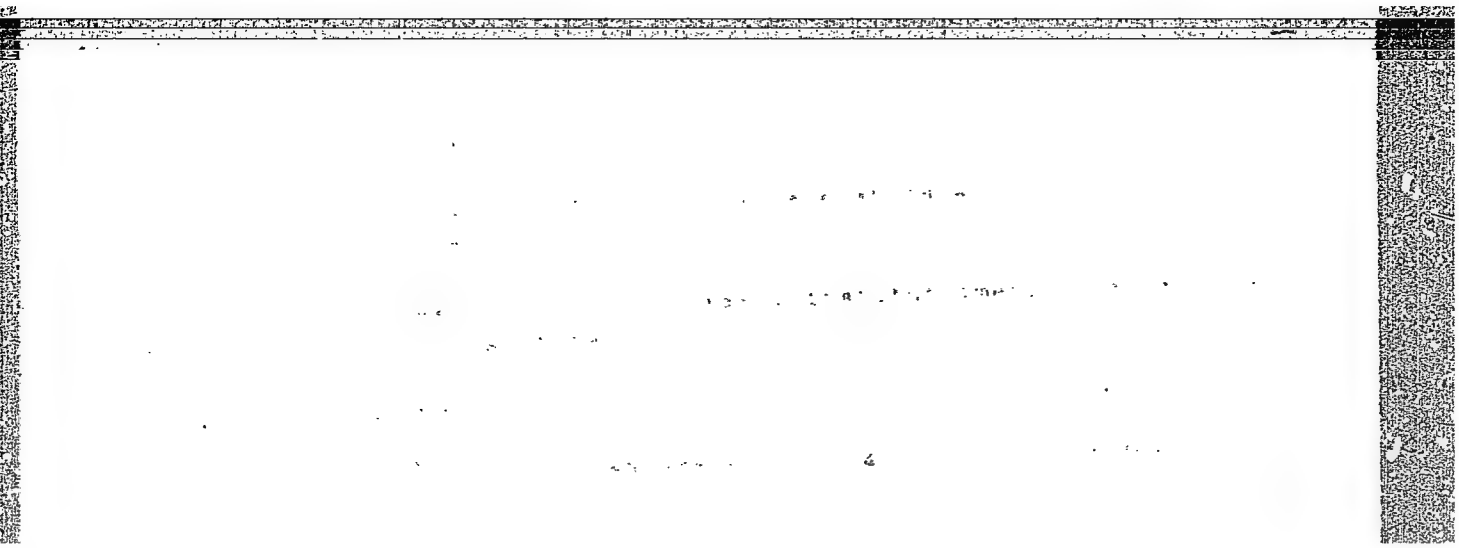

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VOROB'YEV, A.A.; VOROB'YEV, G.A.; KOCHERBAYEV, T.K.; KOSTRYGIN, V.A.; NEKRASOVA, L.G.

Effect of electrodes and the structure of a dielectric crystal on its electric strength. Fiz. tver. tela 6 no.5:1560-1562 My '64. (MIRA 17:9)

1. Tomskiy politekhnicheskiy institut imeni Kirova.

VOROB'YEV, A. A., doktor fiziko-matematicheskikh nauk, prof. ; VOROB'YEV, G. A. , kand. tekhn. nauk; KOSTRYGIN, V. A., kand. tekhn. nauk

Dependence of the electrical strength of solid dielectrics on the thickness of the breakdown layer. Izv. vys. ucheb. zav.; energ. 7 no.5:108-110 My '64. (MIRA 17:7)

1. Tomskiy ordena Trudovogo Krasnogo Znameni politekhnicheskiy institut imeni Kirova. Predstavlena kafedroy tekhniki vysokikh napryazheniy.

L 36481-66 EWT(1) AT

ACC NR: AP6027071 SOURCE CODE: UR/0139/66/000/002/0153/0155

AUTHOR: Vorob'yev, A. A.

ORG: Tomsk Polytechnical Institute im. S. M. Kirov (Tomskiy politekhnicheskiy institut)

TITLE: Remarks on the free energy and the lattice energy of real ionic crystals

SOURCE: IVUZ. Fizika, no. 2, 1966, 153-155

TOPIC TAGS: ionic crystal, free energy, crystal lattice energy, solid physical property, quantum theory, thermodynamics

ABSTRACT: The author considers the linear relation between the free energy and the lattice energy of real ionic crystals and experimentally establishes the relations between the various properties of such crystals. Normal mechanical, thermal, optical, and electrical properties of solids are described by classical thermodynamic and quantum theory with the aid of the free energy. It is shown that the lattice energy can be used instead of the free energy, and results are in good agreement with the conclusions of the dynamic theory of crystal lattices. The relations between the various properties of ionic crystals are then established in terms of the lattice energy, and it is pointed out that this affords a means of comparing the variations in the properties of ionic compounds due to variations in composition or experimental conditions. Lattice energy can thus serve as a single parameter to classify various ionic compounds and their mechanical and thermal properties. The author thanks Docents A. S. Naumova and V. A. Zhdanov for reviewing the paper and for useful remarks. Orig. art. has: 9 formulas. [JPRS: 36,364]

SUB CODE: 20 / SUBM DATE: 16Nov64 / ORIG REF: 006

Card 1/1 mlp

L 46950-66 EWP(e)/EWT(m)/EWP(v)/T/EWP(t)/ETI/EWP(k) IJP(c) JD/HM/HW

ACC NR: AT6024936 (A,N) SOURCE CODE: UR/2981/66/000/004/0238/0253

AUTHOR: Kovrizhnykh, V. G.; Vorob'yev, A. A.; Ponogaybo, Yu. N.; Tsabrov, N. D.; Matveyev, B. I.

42
B+1

ORG: none

TITLE: Preparation of weldable sheets of SAP-1 alloy by coil rolling

SOURCE: Alyuminiyevyye splavy, no. 4, 1966. Zharoprochnyye i vysokoprochnyye splavy (Heat resistant and high-strength alloys), 238-253

TOPIC TAGS: sintered aluminum powder, hot rolling, cold rolling, sheet metal

ABSTRACT: The purpose of the work was to determine the feasibility of preparing thin sheets 0.6 to 3 mm thick of industrial dimensions (1000-1400 mm wide and 3500-7000 m long) from fusion-welded SAP-1 material (a sintered aluminum powder material) by coil rolling on existing industrial equipment, and also to study the mechanical properties and structure of hot- and cold-rolled sheets in relation to the conditions of deformation and annealing. It was found possible to produce such sheets by using a billet made by stamping on a vertical hydraulic press, and to weld them by fusion. Vacuum annealing can be replaced by long high-temperature annealing without vacuum for the purpose of adequately degassing the briquet and imparting weldable properties to the SAP-1 material. In order to obtain the maximum strength characteristics at high temperatures, the sheets should be produced only by hot rolling. If thin sheets cannot

Card 1/2

L 46950-66
ACC NR: AT6024936

be produced by hot rolling alone, the cold rolling should be carried out with a minimum degree of deformation. Orig. art. has: 6 figures and 3 tables.

SUB CODE: 13/ SUBM DATE: none

Card 2/2 afs

VOROBTSOVA, I.Ya.

Comparative study of the radiosensitivity of different strains of Drosophila melanogaster. Dokl. AN SSSR 153 no.4:943-946 D '63. (MIRA 17:1)

1. Predstavleno akademikom N.N. Anichkovym.

VOROB'YEV; MAKSIMOV; BEZRUKIKH, P.

Replies to the editors. Sots. trud 7 no.9:145-146 S '62. (MIRA 15:9)

1. Zamestitel' predsedatelya pravleniya Gosudarstvennogo banka SSSR (for Vorob'yev). 2. Zamestitel' nachal'nika otdela truda i zarabotnoy platy Gosplana SSSR (for Maksimov). 3. Nachal'nik upravleniya bukhgalterskogo ucheta i otchetnosti Ministerstva finansov SSSR (for Bezrukikh). (Wages)

ACCESSION NR: AP3001608 S/0189/63/000/003/0048/0051

AUTHORS: Vorob'yev, A. F.; Monayenkova, A. S.; Privalova, N. M.; Skuratov, S. M.

TITLE: Enthalpy of formation for OH^-, K^+, Na^+, Li^+ ions in water solutions

SOURCE: Moscow. Universitet. Vestnik. Seriya 2, Khimiya, no. 3, 1963, 48-51

TOPIC TAGS: alkali, enthalpy of formation, hydroxyl ion, cation, dilute solution

ABSTRACT: The enthalpy of formation for OH^- and alkaline ions has been calculated at 25C using international tables, 1961 edition, for the atomic weights. A root mean square error analysis has been made to determine the limits of calculation accuracy. For the hydroxyl ion, the calculation is based on the neutralization enthalpy of a strong acid by a strong base in an infinitely dilute solution:

$$OH^-_{(p\text{-}p\infty)} + H^+_{(p\text{-}p\infty)} = H_2O(\text{liquid}).$$

This leads to the values

$$\Delta H_F(OH^-_{p\text{-}p\infty}) = \Delta H_F(H_2O_{liq}) - \Delta H_{neut} - \Delta H_F(H^+_{p\text{-}p\infty}) =$$
$$= (-68{,}32 \pm 0{,}01) - (-13{,}34 \pm 0{,}02) - 0 = -54{,}98 \pm 0{,}02 \text{ kcal/g-ion}.$$

When the enthalpy of formation of the hydroxyl ion is known, the ΔH_F of the cation alkali metals can be determined from the known ΔH_F of alkali-hydroxides in an infinitely dilute

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solution. In an equation form this yields $\Delta H_{p}(M^{+}_{p,p\infty}) = \Delta H_{p}(MOH_{p,p\infty}) - \Delta H_{p}(OH^{-}_{p,p\infty})$, (M = Na, Li, K). Finally, the enthalpy of formation for OH^{-} and the three alkalies is listed as

Ион	OH^{-}	Na^{+}	K^{+}	Li^{+}
ΔH_{p} ккал/г-ион	−54,98±0,02	−57,50±0,02	−60,34±0,02	−66,58±0,04

Orig. art. has: 3 formulas.

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